

July 3, 1944

To: The Surgeon General, War Department (through Chief, Preventive Medicine Section)

Subject: Antipneumococcal Immunization at Sioux Falls Air Base, Sioux Falls, South Dakota

1. A meeting was held at 204 East 72nd Street, New York, New York on June 19th, 1944 to discuss the program. The following were present: Drs. Michael Heidelberger, Paul Beeson and Colin MacLeod (Pneumonia Commission, Board for the Investigation of Epidemic Diseases in the Army); Captain Richard Hodges, M. C., Epidemiologist at Sioux Falls Air Base; Dr. Ruth Pauli, Laboratory Consultant, Office of the Air Surgeon.
2. Captain Hodges reviewed briefly the respiratory disease picture at Sioux Falls over the past 20 months. Pneumococcal Pneumonia has been epidemic throughout the period. Of the pneumococcal types, Type II has been consistently the most important, causing 30-45% of the cases. Types I, V and VII have each been responsible for about 10% of the cases. Since February 1944, 85% of the cases have been typed, prior to that time 45% had been typed. Captain Hodges pointed out that during the sulfadiazine prophylaxis experiment of the past winter and spring the incidence of pneumococcal pneumonia was affected considerably less than streptococcal disease.

PLAN OF STUDY

- A. Epidemiological observations: Carrier Incidence: It is planned to carry out a pre-immunization survey for the presence of pneumococci at the post. This will be started about August 1st, with immunization beginning about September 15th, 1944. The carrier incidence will be determined in the following groups:
- a. Permanent personnel (300 subjects)
 - b. New arrivals (300 subjects)
 - c. Members of teaching groups in relation to length of stay on the post (600)

The technique proposed is as follows: Throat swabs (tonsillar fauces and pharyngeal wall) will be inoculated immediately into Avery tubes and on the surface of blood agar plates. The Avery tubes will be incubated for 4-8 hours, and 0.15 cc of culture then inoculated intraperitoneally in mice. After the death of the mice, direct typing will be carried out on the peritoneal exudate. The heart blood will be cultured on blood agar. Media will be prepared from fresh meat. Rabbit blood will be used. The blood agar plates streaked from the original throat swab will be incubated for 24 hours and then examined particularly for pneumococci and hemolytic streptococci.

Following immunization the carrier incidence of pneumococci is to be observed for the duration of the study. It is anticipated that 50-100 cultures can be handled each week in addition to the other work.

Mode of spread of pneumococci: In addition to routine carrier studies as outlined above, carrier studies are also to be made in

- a. personnel of barracks where cases of pneumonia have occurred.
- b. persons with upper respiratory infections. (This does not infer that pneumococcus is responsible for cases of u. r. i., but the carrier incidence may increase under such circumstances or the

number of pneumococci increase in throat of individuals with u. r. i.)

In addition, the presence and persistence of pneumococci in barracks dust and blankets will be studied.

Antibody studies: It is considered important to measure antibody for pneumococcus Type I, II, V and VII before and after immunization. This will be done in Dr. Heidelberger's laboratory in New York by the quantitative precipitin technique. Bleedings before immunization, will be obtained about September 1, 1944.

- a. permanent personnel, both those carrying epidemic types and non-carriers (20 subjects)
- b. new arrivals (60 subjects)
- c. teaching groups (60 subjects)

Six - eight weeks after immunization, antibody studies will be carried out on 60 subjects. This will be repeated after 4 months on as many of the subjects as are still available.

In addition to these studies, antibody determinations will be made on patients recovered from pneumonia, blood to be drawn on the day of discharge and two months later.

For the antibody studies bleedings of 40 cc are necessary. The serum is to be separated under sterile conditions, and preserved by the addition of merthiolate in final concentration of 1:5000. The specimens will then be sent to Dr. Heidelberger.

B. Immunization with Polysaccharides: Selection of subjects:

- a. Half of each of the two teaching groups at the time the study is begun.
- b. Half of the new arrivals assigned to each teaching group during the course of the study.

Dosage of Polysaccharides: .06 mgm of each of the polysaccharides of pneumococcus Type I, II and V, made up in 0.5% phenolized saline, Borkfeld filtered. Dose to be contained in 1.0 cc and to be administered subcutaneously. The solutions of polysaccharide are to be prepared by E. R. Squibb and Co. from polysaccharides originally prepared by them for the Pneumonia Commission and sent to Dr. Heidelberger. Arrangements for the above have already been made. These polysaccharides have been used by Dr. Heidelberger in the preliminary experimental work. The solutions will be tested for sterility by Squibb before release. They will be dispensed in 100 cc and 30 cc vials capped with rubber diaphragms. 12 liters of solution are being prepared. If present tests on Type VII polysaccharide, kindly supplied by Dr. Augustus B. Wadsworth, are satisfactory, 0.1 mg of this polysaccharide will also be included in the mixture, keeping the final volume at 1 cc. The inclusion of the Type VII polysaccharide, however, is not considered essential to the success of the study.

Estimation of antibody response: Bleedings will be taken on 60 subjects 6-8 weeks after immunization. This will be repeated 4 months after immunization on as many of the original 60 as are still available.

- C. Studies of epidemic strains: It is possible that the epidemic strains, particularly Type II may have certain distinctive properties, especially the ability to persist in the pharynx of normal individuals. To study this aspect of the problem, 10 strains of each of Type I, II, V and VII will be obtained from carriers, shipped immediately to Dr. MacLeod in New York where they will be lyophilized following a minimum number of transfers in artificial media. As opportunity is presented, these strains will be tested for their ability to persist in the pharynx of normal individuals following experimental introduction.
- D. Laboratory space and Equipment: With the assistance of Dr. Ruth Pauli, a list of laboratory equipment was prepared. The items have been ordered by the Office of the Air Surgeon and should be available at Sioux Falls by July 15, 1944. Laboratory space is being provided. It is recommended that one end of the laboratory be partitioned to provide space for mice and rabbits. An outside animal room is not considered necessary.
Mice for pneumococcal isolation will be purchased from the funds of the Pneumonia Commission.
- E. Personnel for the Study: Dr. Ruth Pauli plans going to Sioux Falls on or about July 15th to set up the laboratory and train the technical assistants in pneumococcal isolation and typing. Dr. Pauli expects to stay at Sioux Falls until the laboratory side of the study is operating smoothly. Three enlisted technical assistants formerly at Buckley Field have been assigned to this project; in addition, a civilian technician, expert in typing and presently at Sioux Falls, has been requested.

General supervision of the study is to be undertaken by Dr. MacLeod and Dr. Beeson of the Pneumonia Commission, though it is not expected that either will be able to be present continuously throughout the period of the study. Dr. MacLeod plans to go to Sioux Falls early in August; Dr. Beeson in September. Direct supervision of the program is to be in the hands of Captain Richard Hodges, M. C., Epidemiologist at Sioux Falls.

Respectfully submitted,

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cc: General Bayne-Jones (6) for transmission to the following:
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